Remarks

The Office Action mailed 8 July 2003 has been received and reviewed. No claims have been cancelled or amended. Therefore, claims 1, 3-5, 7-21, 23-25, and 27-51 are pending in the present application. Reconsideration and withdrawal of the rejections are respectfully requested in view of the following remarks.

Drawings

Applicants respectfully request consideration and approval of amended Figures 3 and 11 submitted with Applicants' response to the 7 November 2001 Office Action.

The 35 U.S.C. §103 Rejection

Claims 1, 3-5, 7-13, 15-17, 19, 21, 23-25, 27-33, 35-38, 40-41, and 43-51

The Examiner rejected claims 1, 3-5, 7-13, 15-17, 19, 21, 23-25, 27-33, 35-38, 40-41, and 43-51 under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 4,745,543 to Michener et al. (hereinafter "Michener") in view of U.S. Patent No. 5,375,199 to Harrow et al. (hereinafter "Harrow"). Applicants respectfully traverse the rejection of the claims.

In each of independent claims 1, 21, 40, 43, 47, and 51, Applicants teach a computer implemented graphical user display and/or method for providing real-time process information to a user for a process that is operable under control of one or more process variables. The one or more process variables include high and low process limit values associated therewith. The graphical user display includes one or more graphical devices, where each graphical device corresponds to a process variable. The graphical device for a corresponding process variable includes a display of a gauge axis and a first and second pair of high and low elements. The first pair of high and low limit

elements are representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set. The second pair of high and low limit elements are representative of the operator set high and low limit values for the corresponding process variable which define a range in which the process is free to operate. The first and second pair of high and low limit elements are displayed on the gauge axis. A graphical shape is displayed along the gauge axis representative of a value of the corresponding process variable relative to the process limit values.

It is to be noted that certain terms used in the claims have been further defined by the previous amendment as requested by the Examiner even though such terms had already been defined in the specification. For example, the following description is given in the specification for various "limit" terms:

> As used herein, engineering physical limit values refer to limit values that define the physical limits of a piece of equipment or instrumentation. They represent the widest possible range of meaningful quantification of a process variable. For example, there may be engineering physical limits to measurements that a sensor may be able to provide.
>
> As used herein, engineering hard limit values are those limit values set by a user, particularly a control engineer, to establish a range over which an operator or another user can safely set operator set limit values.
>
> As used herein, operator set limit values are limit values through which operators exert influence on the controller 14. Such limits establish the range in which the control solution is free to act when it is afforded sufficient degrees of freedom.
>
> Lastly, as used herein, optimization soft limits, or otherwise referred to herein as delta soft bands, are pseudo limits describing an offset within the operator set limits that the optimization calculations will attempt to respect.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the

reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations.

Applicants respectfully submit that Michener and Harrow fail to teach or suggest all the claim limitations of the independent claims 1, 21, 40, 43, 47, and 51. For example, Michener and Harrow fail to teach or suggest displaying a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set **and** fail to teach or suggest a second pair of high and low limit elements representative of operator set high and low limit values for the corresponding process variable which define a range in which the process is free to operate, as recited in each of such claims.

Michener, as summarily described in column 2, line 62 through column 3, line 5, merely provides a display panel that defines first and second parallel bar graph indicators having a common scale (i.e., the bar graph indicators are parallel to the vertical scale), a third bar graph indicator have a separate scale, and a digital indicator. The first indicator displays the process variable in analog terms, the second indicator displays the set point in analog terms and the third indicator displays the output in analog terms.

The only process related values described in Michener with relation to the common scale are the process variable value and the set point. Michener does not display a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set **and** does not display a second pair of high and low limit elements representative of operator set high and low limit values for the

corresponding process variable which define a range in which the process is free to operate.

It appears that the Examiner equates the display of a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable (e.g., those that define a range in which operator set high and low limit values are set) to scale of 0-100 in Michener. This is inappropriate. The values 0 and 100 on the scale have in no manner been described by Michener, and it is not taught or suggested by Michener, that such values are engineering hard limit values that establish a range over which an operator or another user can safely set operator set limit values (e.g., engineering hard limit values set by a user, particularly a control engineer). The 0 and 100 are merely part of a 0-100% scale and are not functional limit values. They are not indicated as being a limit on anything, upper or lower, for the process variable.

Further, it appears that the Examiner equates the switches S3 and S4 as described in column 6 of Michener to a second pair of high and low limit elements representative of operator set high and low limit values for the corresponding process variable which define a range in which the process is free to operate. However, such a comparison is not understood. Switches S3 and S4 do not describe high and low limit elements that are displayed on a gauge axis as described in the pending claims. The switches S3 and S4 carry out control functions as described in Michener (e.g., the switches are used to control the set point). For example, operation of one of the switches causes an increase in the set point while the other causes a decrease in the set point. Although, it would appear that the single set point value indicated by the bar graph gets increased or decreased, this in no manner can be construed to be a display of operator set high and low limit values for a corresponding process variable which

define a range in which the process is free to operate. Rather, the set point is a single value that the operator wants the process to achieve.

Further, the Examiner recognizes that Michener does not show a graphical user display, a gauge axis and a graphical shape displayed along the gauge axis. However, the Examiner alleges that Harrow describes such elements. As Michener does not teach or suggest various elements of the claims as described above, Applicant generally traverses the Examiner's allegations regarding Harrow, and points out that the elements lacking in Michener (e.g., a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set **and** a second pair of high and low limit elements representative of operator set high and low limit values for the corresponding process variable which define a range in which the process is free to operate) are also not described, taught or suggested in Harrow.

Harrow recites a system monitoring device that displays historical or real time information and also allows a user to set, via direct manipulation, a range of values for use by the system. For example, a user interface allows the user to expand the value of an interactive icon 200. The exemplary interactive icon 200 is illustrated in its expanded state on the graph in FIG. 13A where the user can move the range of values along the y-axis by dragging the slider 202 of the interactive icon 200 to change values associated with the interactive icon 200. Harrow indicates that the interactive icon 200 . . . allows a user to set a range of values in relationship to graphically presented data. (Col. 17, line 68 – Col. 18, line 2). In its default condition, the indicator bar 204 of the interactive icon supplies a single crossing threshold represented by a thin line (Col. 18, lines 12-16) for a variable (i.e., CRC errors per hour). Thus, the indicator bar 204 provides a single limit value for a particular variable, i.e., CRC errors per hour.

According to Harrow, a user can expand the value of the interactive icon 200 (i.e., the indicator bar 204) into a range of values so that the single limit value for the variable (i.e., CRC errors per hour) is a range designated for control of an alarm. For example, 206 in Figure 13A of Harrow indicates that "46" is the value at which "SOUND ALARM WHEN VALUE RISES ABOVE", and 208 in Figure 13A indicates that "26" is the value at which "CANCEL ALARM WHEN VALUE FALLS BELOW". As such, the values shown at 206 and 208 of Harrow represent an expanded range of values for a single operator limit value used to provide alarm function. In other words, Harrow provides an alarm range at the upper operator limit for the variable being monitored (e.g., CRC errors per hour). Harrow does not show "operator set high and low limit values."

Contrary to Michener and Harrow, the present invention provides the second pair of high and low limit elements representative of operator set high and low limit values. As defined in the specification, such operator set limit values are limit values through which operators exert influence on the controller. Such limits establish the range in which the control solution is free to act when it is afforded sufficient degrees of freedom. The operator set limit values fall within a range established by the engineering hard limit values. In other words, the engineering hard limit values are those limit values set by a user, particularly a control engineer, to establish a range over which an operator or another user can safely set operator set limit values.

The limits discussed in Harrow are clearly only focused on a single operator limit (i.e., a high limit designated as line 204) for a variable (e.g., CRC errors per hour). A user can provide a range at this high limit to control some other activity (i.e., an alarm) through the designation of several values (i.e., 206 and 208) at the single operator limit, but there is no description of operator set high and low limit values that establish the range in which the control solution is free to act when it is afforded sufficient degrees of freedom. In other words, the values in Harrow which according to the Examiner teach

the operator set high and low limit values are only pertinent to a single operator limit and an alarm range associated therewith, and not operator set high and low limit values.

Michener is clearly focused on providing information with respect to the set point and the process variable value. There is no description in Michener, nor does Michener teach or suggest, engineering hard high and low limit values or operator set high and low limit values that establish the range in which the control solution is fee to act.

As such, Michener and Harrow fail to teach or suggest, besides other things, both a first pair of high and low limit elements representative of engineering hard high and low limit values and a second pair of high and low limit elements representative of operator set high and low limit values for a corresponding process variable, as recited in each independent claim.

Further, in addition to Michener and Harrow failing to teach or suggest all of the claim limitations as clearly set forth above, there is no teaching or suggestion in either of the references that would motivate one skilled in the art to make a modification to Michener using the teachings of Harrow as alleged by the Examiner so as to arrive at the present invention. The Examiner alleges that it would have been obvious to one skilled in the art, having the teachings of Michener and Harrow before them to modify Michener with elements of Harrow "in order to allow the user to exploit their strengths in detecting and resolving process abnormalities as taught by Harrow et al."

However, as explained above, neither Michener nor Harrow show user defined operator high and low limits as indicated by the Examiner, nor engineering hard high and low limits elements. As such, no modification would provide the present invention as described in the accompanying claims.

For at least the above reasons, independent claims 1, 21, 40, 43, 47, and 51 are not obvious in view of the cited references.

With respect to claims 3-5, 7-13, 15-17, 19, 23-25, 27-33, 35-38, 41, 44-46, and 48-50, Applicants respectfully submit that these claims are also patentable as further limitations of respective patentable base independent claims from which they directly or indirectly depend. Furthermore, such claims are each patentable over Michener and Harrow based on the subject matter recited respectively therein and Applicant generally traverses the allegations that such claims are obvious over the cited references. For example, various remarks are further provided below with respect to many of such claims.

For claims 4 and 24, Applicants respectfully submit that the Examiner fails, besides other things, to show where Michener or Harrow teach or suggest a single pair of parallel lines on a gauge axis that represent both an engineering hard high and low limit values and an operator set high and low limit values, as recited in claims 4 and 24. In addition, Applicants respectfully submit that the Examiner has failed to identify a suggestion or a motivation to combine Harrow and Michener so as to arrive at the subject matter recited in claims 4 and 24.

For claims 7 and 27, the Examiner asserts Michener demonstrates the claimed elements. Applicants respectfully traverse these assertions. There is nothing in Michener that would show the graphical shape positioned adjacent one of the pair of high and low limit elements when the value for the corresponding process variable is within a certain range of the engineering hard high/low limits.

Further, the Examiner indicates that the adjacent position is inherent. A *prima facie* case of inherency can be rebutted by evidence showing that the prior art does not necessarily possess the characteristics of the claimed limitations. Under the principles of inherency, if the prior art, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. The fact that a certain result or characteristic may

occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *See In re Rijckaert*, 9 F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art) (see M.P.E.P §2112).

In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. (M.P.E.P §2112). It is respectfully submitted that the Examiner has not met the burden of providing a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the cited documents. In other words, Applicant submits that the position of the graphical shape as alleged by the Examiner does not necessarily flow from the teachings of the cited documents as there are various other positions or manners of showing that the value for the corresponding process variable is within a certain range of the engineering hard high/low limits.

For claims 8 and 28, the Examiner asserts that Michener and Harrow demonstrate the subject matter recited in claims 8 and 28. Applicants respectfully traverse these assertions. Claims 8 and 28 state in part that the graphical shape is positioned outside of the parallel lines of the second pair of high and low limit elements when the value for the corresponding process variable is outside the operator set high and low process limit values by a predetermined percentage. As Michener and Harrow fail to teach or suggest a pair of high and low elements representative of operator set high and low process limit values, the other limitations of this claim cannot be met.

For claims 9 and 29, the Examiner asserts that Michener shows such elements in combination with the graphical symbol of Harrow. It is unclear to Applicant which

symbol is representative of an optimization characteristic as alleged by the Examiner. At such time that the Examiner clarifies the rejection, Applicant will address such a detailed rejection.

For claims 10, 11, 30, 31, 44-45, and 48-49, the Examiner states that Harrow shows the graphical user display of claim 9, and that Michener teaches the graphical symbol is representative of a corresponding process variable to be maximized. Applicants respectfully traverse these assertions. It is unclear to Applicant which symbol is representative of a corresponding process variable to be maximized as alleged by the Examiner. At such time that the Examiner clarifies this rejection, Applicant will address such a detailed rejection.

For claims 12, 32, 46, and 50, the Examiner alleges Harrow discloses the graphical symbol and Michener shows the symbol representative of a corresponding process variable to be held at a resting value. Applicant respectfully traverses such assertions and in response asserts that no such graphical symbol provides such a representation.

For claims 13 and 33, the Examiner alleges Harrow discloses the graphical symbol and Michener shows the symbol representative of a corresponding process variable being constrained to a set point. Applicant respectfully traverses such assertions and in response asserts that no such graphical symbol provides such a representation.

For claims 15 and 35, Applicants respectfully traverse the Examiner's allegations using Official Notice to assert that use of a circle positioned along the gauge axis is obvious.

For claims 19 and 41, the Examiner continues to assert that Harrow et al. discloses a matrix display having the manipulated variables displayed along a first axis thereof and the controlled variables displayed along a second axis thereof, wherein

each of the manipulated and controlled variables includes a graphical device displayed in proximity thereto. Applicants respectfully traverse the rejection. Nothing in the references even comes close to showing such a matrix display.

Applicants respectfully submit that Harrow fails to teach the above-recited subject matter of claim 19. Rather, Harrow teaches a "graphic display of data" having Cartesian coordinates defining an independent axis "CRC Errors" and a dependent axis "Time" on which a graphical indication of the CRC errors per hour are plotted (Col. 18, lines 16-32). As such, Harrow, however, does not teach or suggest a matrix display with manipulated variables displayed along a first axis and the controlled variables displayed along a second axis, or a graphical device displayed in proximity to each of the manipulated and controlled variables, as recited in claim 19.

For claim 36, the Examiner asserts that Michener, describes the color limitations described therein. Applicants respectfully traverse the rejection and submit that Michener does not teach or suggest displaying the graphical shape in one of a set of colors that reflects the state of the variable. Michener merely describes the use of a neon orange color for display of digits, and nothing more.

For claim 38, the Examiner asserts that Harrow describes such limitations. Applicants respectfully traverse the rejection and submit that Harrow does not teach or suggest displaying a matrix display having manipulated variables displayed along a first axis of the matrix and the controlled variables displayed along a second axis of the matrix.

Based on at least the forgoing reasons, the Office Action fails to establish a *prima facie* case of obviousness for the rejection of the pending claims 1, 3-5, 7-13, 15-17, 19, 21, 23-25, 27-33, and 35-38, 40-41, and 43-51. Applicants respectfully request reconsideration and allowance of such claims.

Claims 18, 20, 39, and 42

The Office Action rejected claims 18, 20, 39, and 42 under 35 U.S.C. §103(a) as unpatentable over Michener in view of Harrow and further in view of U.S. Patent No. 5,631,825 to van Weele *et al.* (hereinafter "van Weele"). Applicants respectfully traverse the rejection of each of the claims.

For claims 18, 20, 39, and 42, Applicants respectfully traverse the rejections and repeat the arguments presented above given for the independent claims from which these claims directly or indirectly depend. Such claims are also allowable in view of their own limitations.

Applicants respectfully request reconsideration and allowance of claims 18, 20, 39, and 42.

Allowable Subject Matter

Applicants acknowledge the Examiner's indication that claims 14 and 34 are objected to as being dependent on a rejected base claim, but that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, Applicants have not rewritten the claims in independent form as it is believed that the claims upon which they depend are also in allowable condition. However, Applicants reserve the right to rewrite such claims at a later date.

Summary and Request for Examiner Interview Prior to Disposition of Case

It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. It would appear that the Examiner is still unclear as to the limitations of the present invention and does not recognize the differences between Applicants' invention and the cited references. It is requested that the Examiner contact Applicants' Representatives at the below-listed telephone number if the case is not allowed to discuss the prosecution of this application when it is taken up for consideration.

Respectfully submitted for

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CERTIFICATE UNDER 37 C.F.R. 1.8:
The undersigned hereby certifies that this paper is being deposited in the United States Postal Service, as first class mail, in an envelope addressed to: Assistant Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 8th day of Oct, 2003.

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